Technical Brief
AN224 Rev B1

Universal Wireless OEM Radio Connector (UWORC)

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Summary

Raveon's UWORC connector is implemented on all OEM radio modems, enabling a user to utilize many different radio modems in their system.

The RV-M8, Daisy, Daisy-Cellular and Daisy-Narrowband Radio Modems use a common connector pinout to allow pin-for-pin and protocol-for-protocol interchangeability. Raveon calls this the UWORC interface.

System integrators can count on being able to plug in any Raveon OEM Module Radio Modem using the same signals, commands, and protocols to quickly adapt their communications system to a specific application.

By implementing the features of the UWORC, device manufacturers can ensure universal availability of the following wireless protocols:

- RV-M8 (5W VHF and UHF)
- LoRa (915mHz ISM band
- 3G and 4G IP Direct

RV-Z50 with UWORC

Designing systems to migrate between UHF, VHF, 3G/4G Cellular, and 900 MHz LoRa becomes simple when using Raveon Radio Modems.

Interface Features

1. DC Power Input and 3.3V DC output.
2. Asynchronous serial Data with CTC and RTS
3. 3 Digital General Purpose Input/Output (GPIO)
4. Device enable pin to control DC power
5. Analog RSSI output signal
6. The I/O connector is a 20-pin header, 2 mm pin spacing.

UWORC
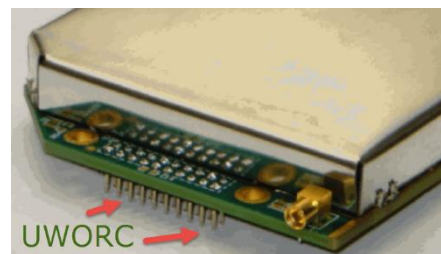
Pinout

The following table details each pin's function and detailed implementation on supported hardware:

Pin No.	Name	I/O	Type	M8	M8/M6 Daisy (VHF, UHF, UHF+)	D50/Z50 Daisy (LoRa and 3G/4G)
1	GND			Ground		
2	VIN	I		12-30V	12-30V (5V without –V option)	
3	CD	O	Dig	Carrier Detect		
4	TX_ON	O	Dig	Transmitter On Indicator		
5	RX	I	Dig	UART Receive Data		
6	TX	O	Dig	UART Transmit Data		
7	EN	I	Dig (Up to Vin)	Enable, Active High Pulled up to Vin with 1Mohm Enable when >2.0V		
8	DTR/ SLEEP/ U2_Rx	I	Dig	Selectable: Data Terminal Ready Sleep (Active High) UART 2 Input		
9	CTS	O	Dig	Clear To Send UART Handshaking		
10	RTS	I	Dig	Ready To Send UART Handshaking. Used to stop/start the flow of data output. 0 = OK to send, 1 = don't send. Leave disconnected if not used.		
11	RSSI	O	Analog	Receive Signal Strength Indicator		Unused (Tied to Pin 17)
12	3_3V	O		3.3V Output		
13	IO_A/ A_IN/ U2_Tx	I/O	Dig/Analog	Selectable: IO_A Digital Functions Analog/Audio Input UART 2 Output		
14	IO_B/ USB_DM	I/O	Dig	Selectable: IO_B Digital Functions USB Negative Line		
15	IO_C/ USB_DP	I/O	Dig	Selectable: IO_C Digital Functions USB Positive Line		
16	STAT1	O	Dig	Status 1 LED Indicator Output 20mA LED Drive Capable		
17	A_OUT	O	Analog	Analog/Audio Output		
18	STAT2/ BLOAD	I/O	Dig	Status 1 LED Indicator Output 20mA LED Drive Capable At power-on (VIN and EN), pull to 3.3V to activate primary bootloader		
19	GND			Ground		
20	V_BU	I		Backup Voltage 3.3V Maximum Leave unconnected if unused		

Mechanical Layouts
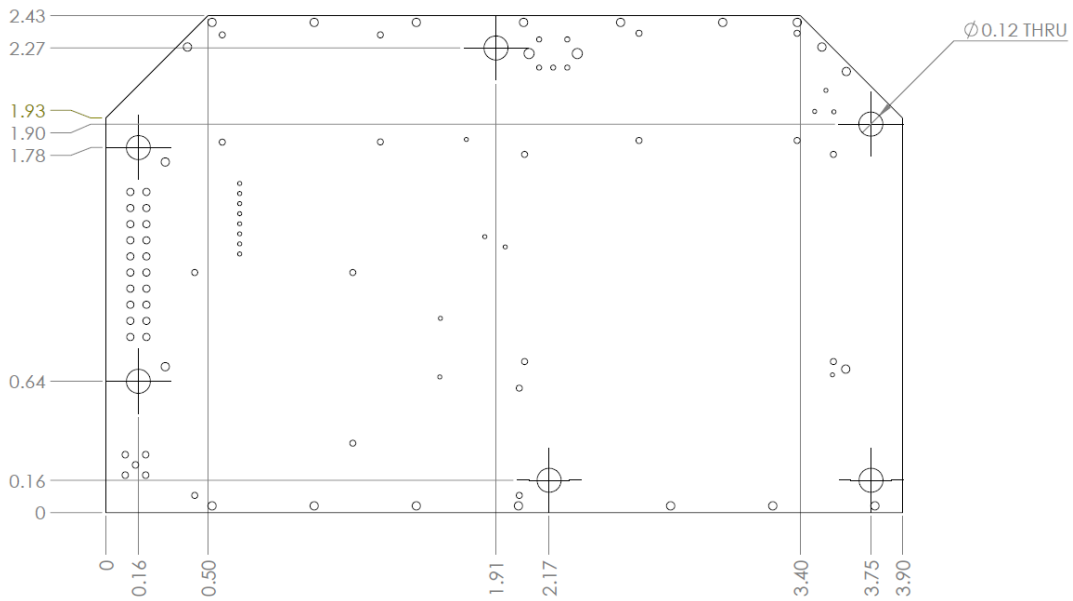
RV-M8
UHF/VHF Daisy Radio Mode
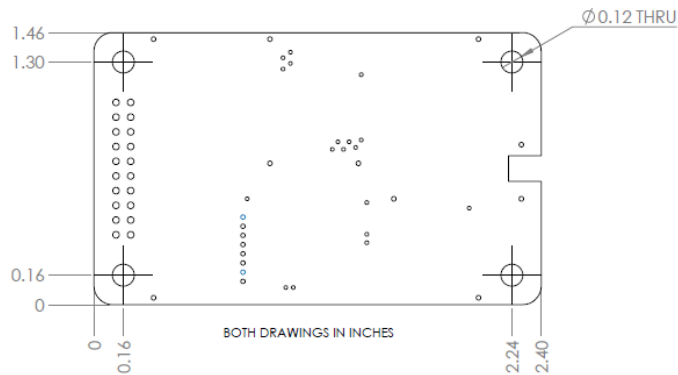
RV-M6
VHF, UHF .1-2W
RV-Z50
Cellular Radio Modem
RV-D50
900 MHz LoRa Daisy Radio Modem

UWORC Connector

Male on the Radio Modem

The male connector on the radio modem is a 20-pin 2mm header. A number of companies provide this type of connector.

Hirose Electric part number A3C-20P-2DSA is the type of connector the UWORC interface has on the radio modem. Pins are rated up to 2A, 200VAC.
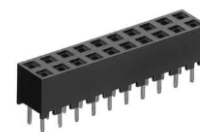
The pin length is typically 3.5mm above the plastic base. The base is 0.9mm so the total height of the connection pins is 4.4mm.
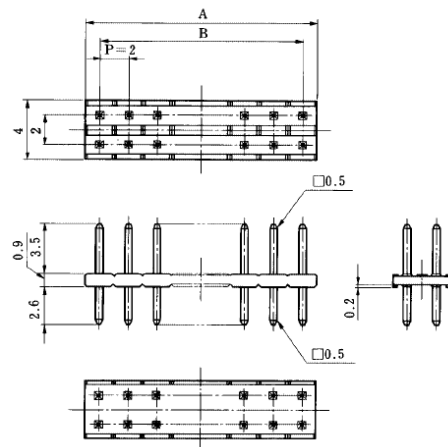
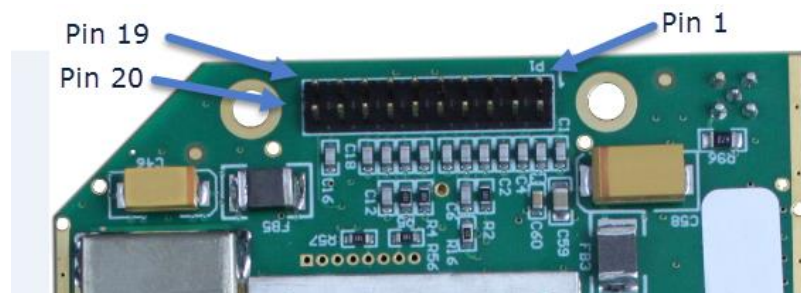## Female on the device the Modem is plugged into

The UWORC connects into a 20 pin heard such as the Hirose A3C-20DA-2DSA(71).

These female connectors are available in SMT and right-angle version from various vendors.

On the bottom of the modem board, the UWORC is oriented as shown below.

Interface Specifications and Information

General Information

These IO pins usually have a RF capacitor on them in the range of 200-1000pF. RF capacitors on them to eliminate RF interference.

Pin 1 and 19: GND

This is the DC ground input. Connect this to the power ground, and if the product is put into a metal enclosure, it is recommended this ground be connected to the enclosure.

Pin 2: VIN

This is the DC voltage input. Refer to the product specification datasheet for the DC voltage limit of the VIN input voltage. Some products have internal regualtors so the DC input is 10-30V DC. Other lower-cost and lower-power modems like the RV-M6 need regulated DC input voltages.

Pin 13,14,15: IO Voltage Levels

These are digital IO pins from a microprocessor internal to the radio mdoem that is running off a 3.3V power supply. These IO lines have 200-1000pF RF capacitors on them to eliminate RF interference.

High level output can output up to 2mA, with a DC output in the range of 3.0-3.3V.

Low level output can output up to 5mA with a DC output voltage in the range of 0-0.4V.

Pin 5: RX serial data input

This is the serial data UART input pin to send data into the radio modem. It is a digital input. A low level input must be less than 0.3V. The low is a digital 0.

A high level input must be greater than 3.0V and not greater than 3.4V. A high level input is a digital 1.

To connect the device with a UWORC to an RS232 serial port, you will need an external digital to serial level converter. Raveon's Tech Series enclosures are available for all radio modem modules with RS232, RS458, USB, RS232, and GPIO options.

Pin 6: TX serial data input

This is the serial data UART output pin to send data into the radio modem. The electrical requirements of this IO pin is the same as IO Voltage Levels on pins 13,14,15.

Pin 11: RSSI (Receive Signal Strength)

One radio modems that use FM RF signals (not LoRa or Cellular), this RSSI pin is an analog output signal from the receiver so that the RF energy level on the receiver's radio channel can be monitored. The RSSI voltage range is in the 0-3V range, but varies model by model and even by various products. If RSSI is sued, the application should calibrate itself if accuracy is required.

Pin 16 and 18: STAT1 and STAT2

These status output pins are used for driving an LED to show the status of the modem. They will blink the LED green if rece3iving, or red if transmitting.

Stat 2 pin 18 must not be pulled up in voltage when the device powers on, because it is used for detecting firmware loading if pulled up.
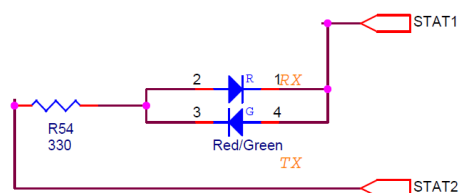
Pin 10: RTS, UART Request to Send

Used to stop the flow of data going into the RX pin from the device connected to the modem. 0 = OK to send, 1 = don't send. If the radio modem cannot accept more data, it will negate this signal (set to a 1). See user manual for ATCH command to configure this feature.